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## » MAPPING BRANCH

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## THE SURVEYS AND MAPPING BRANCH

### CURRENT ACTIVITIES

The activities of the Surveys and Mapping Branch may be classified under two aspects: (1) the various tasks leading to the production of topographical maps, and (2) special tasks entrusted to the Branch for technical and administrative reasons. Among the latter are legal or cadastral surveys in federal lands, electoral district maps, aeronautical charts, the clearing of vista and maintenance of monumentation on the international boundary, the licensing of Dominion Land Surveyors, the administration of a nationwide air-photo library, and various surveys in aid of other government departments.

Geodetic and topographical surveying and mapping are carried out by the Geodetic and Topographical Surveys, two of the Branch's most important divisions.

The Geodetic Survey's task is to maintain and extend the horizontal and vertical control system of accurately positioned points all across Canada which serves as the basis and starting point of all other types of surveys. The division sends about 17 regular parties into the field each year, usually in summer, although some operations such as levelling are more easily done in winter.

Most of these surveys - consisting chiefly of levelling and a combination of triangulation and trilateration - are now carried on in the northern regions of the country, the southern portions having been covered fairly adequately. Where geodetic work is done in the south it consists chiefly in closing various gaps in the network and in special control surveys in and around urban areas. The last-named task has assumed particular prominence in the last few years, and the Geodetic and Topographical Surveys have provided many Canadian municipalities with their first accurate monumented control system that should form the basis of all future public-works projects, town planning, etc. These urban surveys will be extended to many more and smaller communities in the coming years, and are firmly tied in with the national and international geodetic grids.

Other examples of specialized geodetic surveys are the investigation of possible "crustal movement" along the St. Lawrence River, determination of the position of the site for the new Queen Elizabeth II Observatory in British Columbia, and a precise azimuth determination for the layout of a new radio telescope for the National Research Council in Algonquin Park, Ont. Another interesting investigation is the establishment of a geodetic network between

Ellesmere Island and Greenland in order to test the theory that these two land masses are moving relative to each other. The survey is to be repeated in ten years.

The operations of the Geodetic Survey have benefited enormously from the advent of airborne logistics and electronic distance-measurement. In the introduction and perfection of both these techniques, personnel of the Surveys and Mapping Branch have played important roles. The geodimeter and, to a lesser extent, the tellurometer are used routinely on ground surveys. The aerodist, an electronic system based on the correlation of two ground stations with an airborne station, has made possible measurements over distances of up to 160 miles to first-order accuracy. Aerodist has been used both by the Geodetic and Topographical Surveys to carry trilateration across impassable terrain and broad stretches of water, and has helped in the positioning of Baffin Island and Sable Island.

Both the Topographical and the Geodetic Survey are participating in the Canada-United States Satellite Triangulation Program, probably the most advanced technique in electronic geodesy.

The Topographical Survey's chief task is the preparatory work for topographical maps of the most popular and widely used scales - 1:250,000, 1:50,000 and 1:25,000. The division seems reasonably certain to attain its goal of complete map coverage of Canada at 1:250,000 in 1967. Co-ordinated programs of the Topographical Survey and the Army Survey Establishment, together with the ancillary technical units, have produced over 800 of the 925 maps required.

The field work of the Topographical Survey has begun to resemble more closely than it used to the type of work done by the Geodetic Survey, i.e., modern topographical field work consists chiefly in control surveys either for horizontal or vertical networks. The reason for this is that with the introduction of complete air-photo coverage prior to mapping most of the laborious field-mapping has become unnecessary. Modern stereo-plotters are capable of deducing elevations accurately from air photos, and photogrammetry has made the accurate interpretation and correlation of photographs a routine and efficient operation.

Data from control surveys are processed by the Department's computer, and survey data are also supplied to other survey agencies across the country.

The Topographical Survey each year places in the field about 40 surveyors, who work in all parts of Canada. Among recent projects were aerodist control surveys across Hudson Bay and Hudson Strait, supplementary control for 1:50,000 and

1:250,000 mapping in the Deception Bay area, co-ordinate municipal control surveys in various cities from Charlottetown, P. E. I., to Kamloops, B. C.; aerodist-fixed photo surveys for the mapping of islands and shoals in James and Hudson Bays in co-operation with the Canadian Hydrographic Service; and spirit levelling along the famous Churchill (formerly Hamilton) River in Labrador, site of a proposed power plant.

Several distinct functions are grouped within the Legal Surveys and Aeronautical Charts Division. The division has recently participated in the survey and demarcation of various interprovincial and territorial boundaries in the northwest, and is also entrusted with reviewing the drafts of descriptions of federal electoral districts. It sends out each year 15 to 20 field parties for surveying in federal lands, - townsites and subdivisions in the Yukon and Northwest Territories, property surveys in Indian Reserves, boundaries of national parks.

The division is also the sole agency in Canada for the preparation of aeronautical charts. Much of the work in this type of mapping arises from the necessity to constantly keep up with the flow of new aeronautical information and to present it in such a way that it may easily be digested by the pilot.

The International Boundary Commission, which employs approximately three professional surveyors full time, concerns itself with maintaining the Canada-United States boundary in an effective state of demarcation. It places about three parties in the field each summer for the reclearing of the boundary vista through wooded areas and the maintenance and erection of boundary monuments. It also carries out re-surveys and inspections.

The surveying and mapping operations of these "field" divisions are strongly supported by an elaborate and highly advanced printing establishment. The enormous output and versatility of the Branch's Map Compilation and Reproduction Division is made possible by photo-mechanical support and the general use of scribing. The division also prints maps for many other government agencies, and is without doubt Canada's largest and most advanced map-printing establishment.





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